

Exhibit O



Initiative for Resiliency in
Energy through Vehicles

NASEO

National Association of
State Energy Officials

Integrating Alternative Fuel Vehicles into Emergency Plans:

A Toolkit for Tennessee

Acknowledgements

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Cover Photo Credit: 7 Places to Go On Your Next Tennessee Road Trip. Infiniti. January 29, 2016.
<https://www.infinitiofcoolsprings.com/blogs/739/7-places-tn-road-trip/>

Background and Purpose of the iREV Policy and Planning Toolkit

Vehicles that run on alternative fuels – such as biodiesel, electricity, natural gas, and propane – can help build system resiliency by diversifying an emergency response fleet. If a storm or other emergency disrupts a state’s primary fuel supply, emergency managers should have a plan to activate fleets that run on alternative fuels to perform essential services. Integrating alternative fuel vehicles into emergency operation plans and related plans will allow a jurisdiction to rely on a diversified pool of fuel resources in the event of a petroleum shortage.

The National Association of State Energy Officials has launched a nation-wide program – the [Initiative for Resiliency in Energy through Vehicles \(iREV\)](#) – to help integrate alternative fuel vehicles into emergency operation plans. iREV has developed a series of reports that outline the benefits of alternative fuel vehicles, highlight ways that these fuels have helped states and communities during emergencies, and recommend actions that states can take to integrate alternative fuel vehicles into future emergency plans. Four “case studies” provide basic information on [biodiesel](#), [electric](#), [natural gas](#), and [propane](#) vehicles for emergency planners and provide key context for why alternative fuels should be considered during the emergency planning process, and used during emergencies. A subsequent “[Baseline Assessment](#)” reviews the current status of alternative fuel vehicles in emergency plans, and recommends ways that states may include alternative fuel vehicles in future plans.

An Alternative Fuel Vehicle and Infrastructure Tracking Tool was also developed to help emergency planning entities understand the various alternative fuel vehicle and infrastructure assets and options at their disposal, and optimize planning and investment based on their specific fuel supply, geography, and risk-profile. This “[iREV-Tracking Tool](#)” combines data from the Alternative Fuels Data Center, on-the-ground fleet and infrastructure information relayed through Clean Cities Coalitions, and disaster readiness tools being used at the national level to support critical infrastructure and homeland security.



Figure 1: iREV Tracking Tool sample

NASEO is working with several jurisdictions across the United States to develop Policy and Planning Toolkits that integrate lessons from the above research and provide guidance on ways that communities can incorporate alternative fuel vehicles into their emergency operation plans. The State of Tennessee was selected as a “pilot” community, and NASEO has been working with the Tennessee Emergency Management Agency (TEMA) and the Tennessee Department of Environmental Conservation’s Office of Energy Programs (OEP) to review state emergency operations and energy plans, assess petroleum vulnerabilities and threats to the state, collect data on alternative fuel vehicle and infrastructure locations, and develop recommendations for ways that Tennessee can integrate alternative fuel vehicles into future emergency and energy plans and support the deployment of alternative fuels generally. This Toolkit summarizes NASEO’s findings and provides guidance for Tennessee.

The Jurisdiction

The State of Tennessee is situated in the southeastern portion of the United States and stretches almost 500 miles from North Carolina westward to the Mississippi River. Wide bends in the Tennessee River divide the State into three regions or Grand Divisions: the largely mountainous East; the Middle comprised of a central basin rimmed by highlands; and the West with its low, rolling plains. The Tennessee River and the Cumberland River, which flows in an arc from Kentucky across north-central Tennessee, have histories of destructive floods. In the 20th century, the federal Tennessee Valley Authority (TVA), now the largest public power organization in the nation, built a series of dams to control the rivers which brought hydroelectricity to the region. Today, virtually all of Tennessee and parts of six other states are served by the TVA.

The population of Tennessee is approximately 6.65 million (as of July 2016). The state is comprised of 95 counties and 347 incorporated municipalities. The State's westernmost city, Memphis (Shelby County), is one of the world's busiest hubs for barge, air, truck, and rail cargo traffic. Other large metropolitan areas include: Nashville (Davidson County), Knoxville (Knox County), Chattanooga (Hamilton County), Clarksville (Montgomery County), Jackson (Madison County), Murfreesboro (Rutherford County), and the Tri-Cities of Kingsport-Bristol-Johnson City. Tennessee's climate is relatively mild, but it is greatly influenced by the state's topography. Much of the State experiences hot summers and mild winters, except in the mountains, which are cooler at higher elevations.

Energy consumption among Tennessee's end-use sectors is fairly balanced, with transportation the largest consuming sector (28.3 percent), followed by the industrial sector (26.4 percent), the residential sector (24.6 percent), and the commercial sector (20.7 percent).¹ Manufacturing leads the state's economy and includes the manufacturing of motor vehicles and automotive parts; food, beverages, and tobacco products; and chemical products.

Emergency Planning in Tennessee

TEMA, which is one of three major divisions of the Tennessee Department of Military, is responsible for managing the state's response to emergencies and disasters that affect the citizens of Tennessee and its

¹ U.S. Energy Information Administration. *State Profile and Energy Estimates: Tennessee*. Accessed December 18, 2017. <https://www.eia.gov/state/?sid=TN#tabs-2>

local governments. In the event of an emergency, TEMA provides the Governor with essential information regarding casualties, damage, and recommended protective courses of action. TEMA coordinates state and federal disaster response mechanisms, while providing a direct link between state and local governments, and a conduit for outside assistance from the Emergency Management Assistance Compact (EMAC) between the states and territories and the federal government.

The agency has responsibility to ensure the State and its local governments are prepared to deal with the disasters and emergencies that threaten people and their property. The most prevalent threats in Tennessee are severe storms, floods, forest fires, hazardous materials incidents, and earthquakes. According to the National Oceanic and Atmospheric Administration, the most common natural hazard in Tennessee is thunderstorm and lightning, which occur once every three days on the average during the months of March to October. The second-most common natural hazard is flood, which occurs once every 10.2 days on the average. Tornadoes caused the greatest overall property loss during 1996 to 2014; the second-highest cause of property loss was flooding.

The Tennessee Emergency Management Plan (TEMP), coordinated by TEMA, establishes the framework for a comprehensive emergency management program designed to: address the potential effects of hazards that might impact the State; prepare for implementation of measures to preserve life and minimize damage; respond effectively to the needs of the citizens and local jurisdictions; and provide a recovery system to return the State and its communities to normal status as soon as possible. The TEMP is designed to address all-hazards with a focus on thirteen of prime concern: drought; earthquake; extreme temperature; wildfire; flood; geologic; severe weather; tornado; communicable disease; dam/levee failure; hazardous material release; terrorism; and infrastructure incident. The TEMP is structured using the Federal Response Plan format of specific Emergency Support Functions (ESFs) that categorize disaster services.

The TEMP is comprised of a *Basic Plan*, which is an overview of how the state conducts emergency management operations. *Appendices* provide more detail about various subject-matter areas addressed in the *Basic Plan*. *Attachments*, which provide historical context and information on specific hazards, are separable from the TEMP but attached for ease of use. *Annexes* are stand-alone plans directly linked to the TEMP, but issued separately. These include the 16 all-hazard ESF Annexes that define roles and responsibilities of state and other agencies in each functional area; ESF-12 is the Energy Annex.

The Planning Section of TEMA's Bureau of Preparedness leads the update process for the TEMP and ESF Annexes. The *Basic Plan* is revised at least every five years and requires the Governor's signature. The most recent process, initiated in 2015, is ongoing. The ESF Annexes are updated on a rotating basis, usually one per quarter, to ensure that they are re-visited at least once within the 5-year cycle. All of the primary and support agencies listed for the ESF as well as federal agencies, NGOs and private sector entities are engaged in the planning process.

Each of Tennessee's 95 counties is required to have emergency operations plans modeled after the TEMP. TEMA reviews and archives these plans, and provides significant hands-on support from staff at TEMA's three Regional Field Offices. Several cities also maintain their own emergency plans.

TEMA conducts monthly seminars to discuss various planning topics with state, federal and private sector partners. TEMA also conducts an annual three-day in-service training, including at least one table-top exercise. All counties that receive funding from TEMA (about 70 of the 95 counties) are required to participate in at least three exercises per year. TEMA trains about 12,000 people a year, mostly first responders and emergency managers, in hazardous material response and a variety of other emergency management topics. As noted below, there may be an opportunity for TEMA to include alternative fuels in future trainings with local governments.

Energy Emergency Planning in Tennessee

Tennessee's Energy Assurance Plan (EAP) was developed to facilitate energy emergency preparedness and planning to create a rapid response capability for recovery from disasters, including a Governor's "Declaration of Disaster Emergency" triggered by the disruption or shortage of energy supplies. The EAP outlines when government involvement is warranted, the State's responsibilities during an energy emergency, and the coordination of federal and state resources, when required.

TDEC's OEP is charged with energy system monitoring, emergency response, and informing senior government leaders on Tennessee energy supply issues. OEP led the effort to update the EAP and the ESF-12 Energy Annex to the TEMP, which outlines state agency responsibilities for responding to various types and levels of energy emergencies. The TEMP assigns to OEP the coordination responsibility for non-utility energy emergency preparations and plans.

The EAP is updated approximately every three years with state energy asset information typically updated every year. It is the guiding document for normal operations, elevated operations during the assessment of potential situations, and emergency operations during full emergency response efforts. In addition, the EAP:

- Outlines the concept of operations, organizational plan, and responsibilities for managing and coordinating the occurrence or immediate threat of energy disruptions.
- Lists state actions that will ease the impacts of short-term energy disruptions.
- Provides data and information that will assist with long-term strategies and options for dealing with sustained disruptions or outages.
- Identifies and defines critical infrastructure protection.
- Describes coordination of state organizational relationships and responsibilities.
- Identifies information that the State needs to know regarding specific energy sources as well as pertinent government and industry contacts.
- Identifies steps that state officials can take to work with industry to minimize and resolve the impacts of an energy supply disruption.

Part 2 of the EAP provides Energy Asset Details for each type of energy source. It provides information which is referenced during potential or actual events and is intended to support the EAP for operational and policy decision making by the State during normal and emergency situations. This information is updated annually.

The EAP identifies roles and responsibilities, authorities, actions for state agencies, and stakeholder involvement for energy disruptions or emergencies related to liquid fuels (petroleum, propane, and others) and natural gas. As detailed in the EAP, OEP is responsible for developing preparedness programs aimed at reducing the effects of petroleum shortages within Tennessee and for administering the State Fuel Set-Aside Program as required or requested by the Governor. This requires OEP to, among other things:

- Monitor emerging threats to energy systems, the infrastructure, and supply chains.
- Update and maintain a network of public and private sector energy company contacts.
- Collect and monitor supply, consumption, and production of petroleum fuels.
- Contact petroleum supplier and distributor representatives for indications of what the situation may mean to the industry and to Tennessee.
- Coordinate with the petroleum distributors concerning potential supply availability for Tennessee.

The EAP recommends several mitigation strategies that can be employed during any petroleum supply disruption. These options are further detailed in the Tennessee Petroleum Contingency Plan (see below) and include: managing supply to ensure public need; issuance of waivers; resupply of gas stations along evacuation routes; and a variety of measures to reduce demand.

Petroleum Vulnerabilities

A number of vulnerabilities specific to Tennessee that may impact energy supply, including the variety of energy sources, seasonal changes, and natural disasters. Of significant concern is the New Madrid fault which primarily runs along Tennessee's western border. A significant earthquake along the fault line would have catastrophic impact on the energy systems, supply networks and infrastructure within Tennessee and surrounding regions. Such an event would likely require a mass evacuation which would stress the fuel supply; a diversified source of fuels and vehicles capable of using those fuels could potentially mitigate the impact.

The primary petroleum assets are petroleum refining, interstate and intrastate transmission pipelines, over-the-road delivery systems, and storage. While noticeable disruptions are rare due to robust markets, large finished product reserves do not exist; therefore, system outages can have large and immediate system wide effects.

Energy supplies come from many sources and greatly depend on the transportation infrastructure, which consists of rail, pipeline, water, and road traffic. Each of these modes of transportation is vulnerable during disasters. The supply system for natural gas and petroleum products includes underground pipelines with compressor stations, or barges, which are vulnerable to multiple types of hazards.

Tennessee has one petroleum refinery, a Valero facility located in Memphis, which can process about 180,000 barrels of crude oil per calendar day. The refinery receives its light, low-sulfur crude oil supply from the Capline pipeline that crosses through western Tennessee on its route between the Gulf Coast

and Midwest refineries. Tennessee's refinery has access to the Mississippi River and can also receive feedstocks and ship petroleum products by barge. The refinery produces motor gasoline, diesel fuel, jet fuel, and petrochemicals.

There are 29 major petroleum product pipelines and branches serving the State. These are owned and managed by 18 different companies. Over 70 percent of petroleum products (gasoline and distillate) are transported into the State by the Colonial Pipeline. Colonial supplies terminals in the Nashville, Knoxville, and Chattanooga markets. Knoxville and Chattanooga also receive supply from Kinder Morgan's Plantation Pipeline. West Tennessee is supplied primarily by the Valero Refinery in Memphis. Besides pipelines, product may be trucked to terminals in the four main major metropolitan areas – Nashville, Memphis, Knoxville, and Chattanooga. Terminals in Nashville and Memphis can accept barge deliveries; however, no ocean-going sea vessels can reach these ports. Ten or more local distributors serve the major markets in Tennessee and deliver product to gas and diesel retail outlets and private fueling facilities.

While rare, incidents can occur that disrupt the supply of petroleum products for local use. These can occur upstream of supply – including where the products are sourced, and downstream of supply – by way of local storage and delivery networks. Historically, major disruptions have occurred due to Gulf Coast hurricanes either shutting down Gulf oil rigs or damaging pipeline infrastructure; both incidents can prevent delivery of refined product to Middle and East Tennessee.

For example, in 2008, Middle and East Tennessee experienced major gasoline outages and price spikes when refineries on the Gulf Coast were shut down due to Hurricanes Gustav and Ike. In September 2016, Colonial Pipeline shut down its gasoline pipeline in Alabama due to a major fuel leak. The company constructed a bypass and ultimately restored service 12 days later. In the interim, gas supplies tightened and the Greater Nashville area experienced a “run on the pumps,” with sales increasing 50 percent above normal. OEP monitored the situation and worked to resolve any first responder shortages. The Federal Motor Carrier Safety Administration’s hours of service limits were waived until the end of the month when inventories returned to normal.

Petroleum Contingency Plan

Since Tennessee has very limited petroleum refining capacity and limited petroleum reserves, it needs to plan for potential shortages, and anticipate the impact of supply disruptions. As part of its responsibilities under ESF-12 and as discussed in the EAP, OEP maintains a Petroleum Contingency Plan which documents its responsibilities in managing disruptions to the supply of petroleum fuels.

The Petroleum Contingency Plan follows the four levels of fuel supply conditions to prepare for, respond to, and recover from petroleum shortages as outlined in the [NASEO State Energy Assurance Guidelines](#). These levels have been modified from NASEO's guidance to correlate with TEMA's activation levels. Checklists were developed for each of the following conditions:

- *Level 4* – Normal Conditions where there is no discernible shortage or where there may be shortages elsewhere. Checklist items call for monitoring and issuance of alerts.